



# GEORGIA

DEPARTMENT OF NATURAL RESOURCES

## ENVIRONMENTAL PROTECTION DIVISION

### Air Quality Permit

In accordance with the provisions of the Georgia Air Quality Act, O.C.G.A. Section 12-9-1, et seq and the Rules, Chapter 391-3-1, adopted pursuant to and in effect under that Act,

**Facility Name:** Suniva, Inc.  
**Facility Address:** 5765 Peachtree Industrial Blvd.  
 Norcross, Georgia 30092 (Gwinnett County)  
**Mailing Address:** 5765 Peachtree Industrial Blvd.  
 Norcross, Georgia 30092  
**Facility AIRS Number:** 04-13-135-00272

is issued a Permit for the following:

**Operation of a facility for the manufacture of high-efficiency monocrystalline silicon photovoltaic (PV) cells**

**This Permit is issued for the purpose of establishing practically enforceable emission limitations such that the facility will not be considered a major source with respect to Title V of the Clean Air Act Amendments of 1990.**

This Permit is conditioned upon compliance with all provisions of The Georgia Air Quality Act, O.C.G.A. Section 12-9-1, et seq, the Rules, Chapter 391-3-1, adopted and in effect under that Act, or any other condition of this Permit.

This Permit may be subject to revocation, suspension, modification or amendment by the Director for cause including evidence of noncompliance with any of the above; or for any misrepresentation made in Application No. 28321 dated March 2, 2022; any other applications upon which this Permit is based; supporting data entered therein or attached thereto; or any subsequent submittals or supporting data; or for any alterations affecting the emissions from this source.

This Permit is further subject to and conditioned upon the terms, conditions, limitations, standards, or schedules contained in or specified on the attached 15 pages.



Richard E. Dunn, Director  
 Environmental Protection Division

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**1. General Requirements**

- 1.1 At all times, including periods of startup, shutdown, and malfunction, the Permittee shall maintain and operate this source, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Division which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection or surveillance of the source.
- 1.2 The Permittee shall not build, erect, install or use any article, machine, equipment or process the use of which conceals an emission which would otherwise constitute a violation of an applicable emission standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard that is based on the concentration of a pollutant in the gases discharged into the atmosphere.
- 1.3 The Permittee shall submit a Georgia Air Quality Permit application to the Division prior to the commencement of any modification, as defined in 391-3-1-.01(pp), which may result in air pollution and which is not exempt under 391-3-1-.03(6). Such application shall be submitted sufficiently in advance of any critical date involved to allow adequate time for review, discussion, or revision of plans, if necessary. The application shall include, but not be limited to, information describing the precise nature of the change, modifications to any emission control system, production capacity and pollutant emission rates of the plant before and after the change, and the anticipated completion date of the change.
- 1.4 Unless otherwise specified, all records required to be maintained by this Permit shall be recorded in a permanent form suitable for inspection and submission to the Division and shall be retained for at least five (5) years following the date of entry.
- 1.5 In cases where conditions of this Permit conflict with each other for any particular source or operation, the most stringent condition shall prevail.

**2. Allowable Emissions**

- 2.1 The Permittee shall not discharge, or cause the discharge, into the atmosphere from the entire facility, volatile organic compounds (VOC) in amounts equal to or exceeding 25 tons during any twelve consecutive month period.  
[Avoidance of 391-3-1-.02(2)(tt)]
- 2.2 The Permittee shall not discharge or cause the discharge into the atmosphere from the entire facility any single hazardous air pollutant (HAP) which is listed in Section 112 of the Clean Air Act, in an amount equal to or exceeding 10 tons during any twelve consecutive months, or any combination of such listed pollutants in an amount equal to or exceeding 25 tons during any twelve consecutive months.  
[Title V Avoidance]

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- 2.3 The Permittee shall not discharge, or cause the discharge into the atmosphere, from the entire facility, nitrogen oxides (NO<sub>x</sub>) in an amount equal to or exceeding 25 tons during any twelve consecutive month period.  
[Avoidance of 391-3-1-.02(2)(yy)]
- 2.4 The Permittee shall not discharge, or cause the discharge, into the atmosphere, from all process equipment, any gases which exhibit visible emissions, the opacity of which is equal to or greater than 40 percent, unless otherwise specified.  
[391-3-1-.02(2)(b)1.]
- 2.5 The Permittee shall not cause, let, suffer, permit, or allow the emission from any source, particulate matter (PM) in total quantities equal to or exceeding the allowable rate as calculated using the applicable equation below, unless otherwise specified in this Permit.  
[391-3-1-.02(2)(e)1.]
- a.  $E = 4.1P^{0.67}$ , for process input weight rate up to and including 30 tons per hour;
- b.  $E = 55P^{0.11} - 40$ , for process input weight rate in excess of 30 tons per hour.

Where:

E = allowable emission rate in pounds per hour;  
P = process input weight rate in tons per hour.

- 2.6 The Permittee shall only fire natural gas in all fuel burning sources except the diesel emergency generators.  
[391-3-1-.03(2)(c) and 391-3-1-.02(2)(g)2.(subsumed)]
- 2.7 The Permittee shall comply with all applicable provisions of the New Source Performance Standards (NSPS) as found in 40 CFR 60 Subpart A - "General Provisions" and 40 CFR 60 Subpart IIII - " Standards of Performance for Stationary Compression Ignition Internal Combustion Engines," for operation of the emergency generators.  
[40 CFR 60 Subpart A and Subpart IIII]
- 2.8 The Permittee shall only use diesel fuel that has a maximum sulfur content of 15 ppm (0.0015% by weight) and either a minimum cetane index of 40 or maximum aromatic content of 35 volume percent.  
[40 CFR 60.4207(b) and 40 CFR 1090.305]
- 2.9 The accumulated non-emergency service (maintenance check and readiness testing) time for the emergency generator shall not exceed 100 hours per year. Any operation other than emergency operation, maintenance check and readiness testing is prohibited.  
[40 CFR 60.4211(f)]

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- 2.10 The Permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants (NESHAP) as found in 40 CFR 63 Subpart A – “General Provisions” and Subpart ZZZZ – “National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines” for operation of the emergency generators.

[40 CFR 63 Subpart A and Subpart ZZZZ]

- 2.11 The Permittee shall not operate each wet bench group controlled by the same scrubber (shown in the following table) exceeding 110% of the associated average combined wafer throughput, in units per hour, recorded during the most recent performance tests.

[391-3-1-.03(2)(c)]

Table 2.11: Wet Bench Groups by Scrubber	
Wet Bench Id No.	Scrubber ID No.
WB01, WB02, WB04, and WB05	WS01
WB08 through WB11	WS04
WB06 and WB07	WS06

### **3. Fugitive Emissions**

- 3.1 The Permittee shall take all reasonable precautions with any operation, process, handling, transportation, or storage facilities to prevent fugitive emissions of air contaminants.

### **4. Process & Control Equipment**

- 4.1 Routine inspection and maintenance shall be performed on all air pollution control equipment. Records of all inspection and maintenance shall be kept in a permanent form suitable and available for inspection and submission to the Division.

- 4.2 The Permittee shall operate the control equipment at all times that the associated emission units are operational.

[Title V Avoidance for NO<sub>x</sub>, VOC, and HAPs and Avoidance of 391-3-1-.02(2)(tt) and (yy)]

- 4.3 The Permittee shall maintain an inspection and maintenance plan for the Oxidizers. This plan shall be based on the recommendations of the manufacturer. The Permittee shall keep this plan permanently on file and available for inspection by Division personnel.

- 4.4 The Permittee shall operate the thermal oxidizers (ID Nos. OX01 – OX08) at or above the minimum temperature established during the most recent performance test (at or above 1,382°F before the initial performance test is conducted).

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- 4.5 The Permittee shall operate the scrubbers (ID Nos. WS01 through WS07, DAS01 through DAS04, and SCD1 through SCD15) at or above the associated minimum scrubbant flow rates established during the most recent performance tests (at or above the associated minimum scrubbant flow rates recommended by the scrubber manufacturer before the initial performance tests are conducted).
- 4.6 The Permittee shall operate Scrubbers WS01 through WS07 within the associated pH range established during the most recent performance tests (within the associated pH range recommended by the scrubber manufacturer before the initial performance tests are conducted).
- 4.7 The Permittee shall ensure emissions from the Laser Ablation (Emission Unit IDs: LA01 through LA07) is controlled by air filters (Air Pollution Control Device ID: LS01 through LS07) at all times the associated equipment is in operation. The Permittee shall perform filter changes for the Laser Ablation station within 24 hours of whenever the static pressure drop across the filter systems falls outside the manufacturers recommended value.

**5. Monitoring**

- 5.1 Any continuous monitoring system required by the Division and installed by the Permittee shall be in continuous operation and data recorded during all periods of operation of the affected facility except for continuous monitoring system breakdowns and repairs. Data shall be recorded during calibration checks and zero and span adjustments. Maintenance or repair shall be conducted in the most expedient manner to minimize the period during which the system is out of service.
- 5.2 The Permittee shall install, calibrate, maintain, and operate monitoring devices for the measurement of the indicated parameters on the following equipment. Where such performance specification(s) exist, each system shall meet the applicable performance specification(s) of the Division's monitoring requirements. The monitoring equipment shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manual(s). Record shall be maintained in a logbook which will be available for inspection and/or submittal upon request.  
[391-3-1-.02(6)(b)1.]
  - a. For Each of Wet Scrubbers WS01 through WS07:
    - i. A pH indicator for the measurement of the scrubbant pH. Data shall be recorded once per operating day.
    - ii. A flow meter for the measurement of the scrubbant flow rate. Data shall be recorded once per operating day.
  - b. For Each of Scrubbers DAS1 through DAS4 and SCD1 through SCD15:
    - i. A flow meter for the measurement of the scrubbant flow rate. Data shall be recorded once per operating day.

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- c. For Each of Filters LS01 through LS07:
    - i. A differential pressure indicator for the measurement of pressure drop across each filter. Data shall be recorded once per operating day.
  - d. For Each of Thermal Oxidizers OX01 through OX08:
    - i. A temperature indicator for the measurement of the combustion zone temperature for each thermal oxidizer. Such temperature monitoring device shall have an accuracy of  $\pm 2\%$  ( $^{\circ}\text{F}$ ). Calibration checks of temperature monitoring equipment shall be performed annually. Data shall be recorded continuously when the associated laser ablations are in operation.
  - e. For Each Texturizer Process Bath for Wet Benches WB01, WB02, WB04 through WB11:
    - i. A thermometer for the measurement of the temperature of each process bath. Data shall be recorded once per operating day.
- 5.3 The Permittee shall establish and maintain a preventative maintenance schedule for the Dry Scrubbers (ID Nos. DS01, DS02, DS03, DS04, DS05, DS06 and DS07) which includes material change-out at manufacturer recommended frequency. The Permittee shall conduct a weekly visual inspection of the Dry Scrubbers and the associated alarms and LED warning indicators in order to determine if the devices are in proper working condition. If a device is found to be operating improperly, a description of the corrective actions taken shall be recorded. A record of the conditions found and corrective actions taken shall be retained for at least five years following the date of such record. The records shall be recorded in a permanent form that is suitable and available for inspection by the Division.
- 5.4 The Permittee shall install, calibrate, maintain, and operate a non-resettable continuous monitoring system for the emergency generators to monitor and record the hours operated during emergency service, to monitor and record the hours of operation in non-emergency service (maintenance and/or testing), and to monitor and record the cumulative total hours of operation for each generator.

## **6. Performance Testing**

- 6.1 The Permittee shall cause to be conducted a performance test at any specified emission point when so directed by the Division. The following provisions shall apply with regard to such tests:
- a. All tests shall be conducted and data reduced in accordance with applicable procedures and methods specified in the Division's Procedures for Testing and Monitoring Sources of Air Pollutants.

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- b. All test results shall be submitted to the Division within sixty (60) days of the completion of testing.
  - c. The Permittee shall provide the Division thirty (30) days prior written notice of the date of any performance test(s) to afford the Division the opportunity to witness and/or audit the test, and shall provide with the notification a test plan in accordance with Division guidelines.
  - d. All monitoring systems and/or monitoring devices required by the Division shall be installed, calibrated and operational prior to conducting any performance test(s). For any performance test, the Permittee shall, using the monitoring systems and/or monitoring devices, acquire data during each performance test run. All monitoring system and/or monitoring device data acquired during the performance testing shall be submitted with the performance test results.
- 6.2 Should production rates increase above the rates at which the acceptable performance tests were made, the Division may require that the control equipment be tested for compliance at the higher production rate.
- 6.3 Within 180 days of the startup of the facility, the Permittee shall conduct an initial performance test for volatile organic compound (VOC) destruction and removal efficiency (DRE) on at least four of the eight thermal oxidizers (ID Nos. OX01 through OX08). The tests shall be conducted in accordance with the Division's *Procedures for Testing and Monitoring Sources of Air Pollutants* and shall be conducted at the maximum anticipated exhaust airflow into the oxidizers. The tests shall be used to determine the average VOC DRE of all the thermal oxidizers. During the test, the Permittee shall monitor and record the combustion zone temperature. The results of the performance test(s), temperature-monitoring data shall be submitted to the Division within 60 days of the completion of testing. Destruction and removal efficiency performance tests on the remaining four untested Thermal Oxidizers shall then be conducted within five (5) years of testing the first four oxidizers. Destruction and removal efficiency performance tests shall be conducted every ten (10) years for each oxidizer. Until the completion of the initial performance test is complete, the thermal oxidizer shall be operated at a minimum combustion temperature of 1382°F (750°C). After completion of the performance test, all of the thermal oxidizers shall be operated at the temperature established during the most recent performance test.  
[391-3-1-.02(6)(b)1.]
- 6.4 Within 180 days of the startup of the facility, the Permittee shall conduct a performance test on each of Wet Scrubbers WS01, WS04 and WS06 to determine the VOC, HF, HCl and CL<sub>2</sub> emission rates, in pound pollutant per hour for each scrubber. The test shall be performed while the associated emission units controlled by this scrubber are in operation. During the performance tests for Wet Scrubbers WS01, WS04 and WS06, a proper scrubbant pH range and a minimum scrubbant flow rate for each scrubber shall be determined, recorded and submitted to the Division with the test report. The total combined wafer throughput for each wet bench group controlled by the same scrubber (see Table 2.11), in units per hour, shall also be recorded during the performance tests.  
[391-3-1-.02(6)(b)1.]

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- 6.5 Within 180 days of the startup of the facility, the Permittee shall conduct a performance test on each of Wet Scrubbers WS02 and WS07 to determine the HCl,  $Cl_2$  and  $H_3PO_4$  emission rates, in pound pollutant per cell. The test shall be performed while the associated emission units controlled by this scrubber are in operation. During the performance tests for Wet Scrubbers WS02 and WS07, a proper scrubbant pH range and a minimum scrubbant flow rate for each scrubber shall be determined, recorded and submitted to the Division with the test report.  
[391-3-1-.02(6)(b)1.]
- 6.6 Within 180 days of the startup of the facility, the Permittee shall conduct a performance test on each of Wet Scrubbers WS03 and WS05 to determine the HF,  $HNO_3$ ,  $NO_x$ ,  $H_2SO_4$  and  $SiF_4$  emission rates, in pound per MMBtu (for  $NO_x$ ) and in pound pollutant per cell. The test shall be performed while the associated emission units controlled by this scrubber are in operation. During the performance tests for Wet Scrubbers WS03 and WS05, a proper scrubbant pH range and a minimum scrubbant flow rate for each scrubber shall be determined, recorded and submitted to the Division with the test report.  
[391-3-1-.02(6)(b)1.]
- 6.7 Within 180 days of the startup of the facility, the Permittee shall conduct a performance test on at least two of Wet Scrubbers DAS01 through DAS03, Wet Scrubber DAS04 and at least four of Wet Scrubbers SCD1 through SCD15 to determine the Silane and Ammonia emission rates, in pound pollutant per cell. The test shall be performed while the associated emission units controlled by the scrubbers are in operation. During the performance tests for the wet scrubbers, a minimum scrubbant flow rate for each scrubber shall be determined, recorded and submitted to the Division with the test report.  
[391-3-1-.02(6)(b)1.]

**7. Notification, Reporting and Record Keeping Requirements**

- 7.1 The Permittee shall submit written notification of startup to the Division within 15 days after such date. The notification shall be submitted to:  
Mr. Sean Taylor  
Stationary Source Compliance Program  
4244 International Parkway, Suite 120  
Atlanta GA 30354
- 7.2 The Permittee shall retain the following records:  
[391-3-1-.02(6)(b)1]
- a. Monthly usage records of all materials used at the facility that contain volatile organic compounds (VOC). These records shall include the total weight of each material used and the VOC content of each material (expressed as a weight percentage). The Permittee may subtract from the monthly usage the volatile content of any material disposed as waste provided that the total weight, VOC content (expressed as a weight percentage), and documentation of the method for determining the VOC content of any such waste material

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be included as part of the record. All other calculations used to determine usages should also be kept as part of the monthly record.

- b. Total operating time in a calendar month of each of the scrubbers (ID Nos. WS01, WS04, and WS06),  $T_{WB}$ , in hours per month.
  - c. Paste usage per month,  $PU$ , by MP01 through MP08, combined and in pounds per month.
  - d. Total downtime,  $T_{DT}$ , of the thermal oxidizers (ID Nos. OX01 through OX08), combined and in hours per month. Thermal oxidizer downtime occurs when either (1) the three-hour rolling average RTO combustion zone temperature falls below the minimum combustion zone temperature set point or (2) exhausts bypasses RTO.  $T_{DT}$  shall be the total downtime for both scenarios, combined.
  - e. Total operating time per month,  $T_{MP}$ , of the metal paste application lines (ID Nos. MP01 through MP08), combined and in hours per month (non-cumulative).
  - f. Miscellaneous Usage per month (i.e. IPA for wipedown),  $MU$ , in pounds per month.
  - g. Quantity of natural gas burned monthly in the entire facility, in  $ft^3/mo$ .
  - h. Hours of emergency generator(s) usage per month, in  $hrs/mo$ .
  - i. Quantity of natural gas burned monthly in the water heaters, combined, in  $ft^3/mo$ .
- 7.3 The Permittee shall use the following equation when calculating the monthly VOC emissions from the entire facility. All calculations should be kept as part of the monthly record. These records shall be kept available for inspection by or submittal to the Division for five years from the date of record. Emissions from the Wet Benches shall be based on the Emission Factor (EF) for texturizer and the quantity used per month.

[391-3-1-.02(6)(b)1]

$$VOC_{\text{facility}} = [ \sum(EF_{WB} * T_{WB}) + \text{Paste Emissions} + \sum(EF_{MU} * MU) + \sum(NG * EF_{NG}) + \sum(EF_{EG} * T_{EG}) ] / 2,000$$

$$\text{Paste Emissions} = \sum\{PU * VOC\% * [\%DT + (1 - DRE) * (1 - \%DT)]\}$$

$$\%DT = (T_{DT} / T_{DR}) * 100\%$$

$$\begin{aligned} VOC_{\text{facility}} &= \text{Total Monthly Amount of VOC emissions from the facility, in tons/mo.} \\ EF_{WB} &= \text{VOC emission factor for each texturizer scrubber (ID Nos. WS01, WS04, and WS06), determined in accordance with Condition 6.4 (use the emission factor in Application No. 28321 before the initial performance test is conducted), in lb/hr.} \end{aligned}$$

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- $T_{WB}$  = Monthly operating hours of each of Scrubbers WS01, WS04, and WS06, determined in accordance with Condition 7.2b., in hrs/mo.
- Paste Emissions = Monthly VOC emissions from the use of metal paste in MP01 through MP08
- $EF_{MU}$  = VOC emission factor or VOC content for Miscellaneous Usage, determined in accordance with Condition 7.2a., in lbs VOC per lb material.
- MU = Miscellaneous Usage per month (i.e. IPA for wipedown), determined in accordance with Condition 7.2f., in lbs/mo.
- NG = Facility-wide monthly natural gas consumptions, determined in accordance with Condition 7.2g., in ft<sup>3</sup>/mo.
- $EF_{NG}$  = VOC emission factor for natural gas combustion, 5.5 lbs VOC/10<sup>6</sup> ft<sup>3</sup>.
- $EF_{EG}$  = VOC emission factor for emergency generators, 0.0198 lb VOC/hr (0.01 g/Hp-hr).
- $T_{EG}$  = Monthly hours of operation of Emergency Generator EG01, determined in accordance with Condition 7.2h., in hrs/mo.
- 2,000 = Conversion factor.
- PU = Monthly metal paste usage by MP01 through MP08, combined, determined in accordance with Condition 7.2c., in lbs/mo.
- VOC% = VOC content of the paste, determined in accordance with Condition 7.2a., in percentage.
- %DT = RTO percent down time, in percentage.
- DRE = Average RTO control efficiency, determined in accordance with Condition 6.3, in percentage.
- $T_{DT}$  = Total RTO downtime, determined in accordance with Condition 7.2d., in hrs/mo.
- $T_{DR}$  = Total operating hours per month that any metal print lines are in operation (non-cumulative), determined in accordance with Condition 7.2e., in hrs/mo.

- 7.4 The Permittee shall use the monthly usage records required in Condition 7.2 and the equations shown in Condition 7.3 to calculate the total monthly VOC emissions from the entire facility. All variables used in the calculation, including any Division-approved emission factors or control efficiencies, shall be kept as part of the monthly records. The Permittee shall notify the Division in writing if the total VOC emissions **equal to or** exceed 2.08 tons during any calendar month. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to maintain compliance with the emission limit in Condition 2.1.

[391-3-1-.02(6)(b)1]

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7.5 The Permittee shall use the calculations required by Condition 7.4 to determine the total VOC emissions from the entire facility for each twelve consecutive month period. The Permittee shall notify the Division in writing if the total VOC emissions equal or exceed 25 tons during any consecutive 12-month period. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to attain future compliance with the emission limit in Condition 2.1.

[391-3-1-.02(6)(b)1]

7.6 The Permittee shall retain the following records:

[391-3-1-.02(6)(b)1]

a. Monthly records of all HAP containing materials used as the facility. These records shall include the total weight of each material used and the HAP content of each material (expressed as a weight percentage). All variables used in the calculations, including any Division-approved emission factors, control efficiencies or coating transfer efficiencies, shall be kept as part of the monthly records. If the Permittee wishes to subtract the HAP content of waste materials from the HAP emissions calculations, the records must also indicate the weight of any containerized material disposed as waste, the HAP content of the containerized waste material, and documentation of the method for determining the HAP content of the waste material.

b. Number of photovoltaic cells produced per month, in cells/mo.

c. Total operating time in a calendar month of each of the dry scrubbers (ID Nos. DS02 through DS07),  $T_{PMMS}$ , in hours per month.

d. Total operating time in a calendar month of the dry scrubber (ID Nos. DS01),  $T_{R\&D}$ , in hours per month.

7.7 The Permittee shall use the following equations when calculating the monthly HAP emissions from the following process groups. All calculations should be kept as part of the monthly record. These records shall be kept available for inspection by or submittal to the Division for five years from the date of record. Emissions from the Wet Benches shall be based on the Emission Factor (EF) amount of emissions per hour determined from the most recent performance test and the hours of operation.

[391-3-1-.02(6)(b)1]

a. Wet Benches WB01, WB02, and WB04 through WB11 (via Scrubbers WS01, WS04, and WS06)

$$\text{Total HAP}_{WB} = \sum(\text{HEF}_{WB} * T_{WB}) / 2,000$$

Total HAP<sub>WB</sub> = Total monthly HAP emissions from the wet benches, in tons/mo.

HEF<sub>WB</sub> = HAP emission factor(s) for each texturizer scrubber (ID Nos. WS01, WS04, and WS06), determined in accordance with Condition 6.4 (use the emission factor in Application No. 28321 before the initial performance test is conducted), in lb/hr.

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$T_{WB}$  = Monthly operating hours of each of Scrubbers WS01, WS04, and WS06, determined in accordance with Condition 7.2b., in hrs/mo.

2,000 = Conversion factor.

- b. Chemical Diffusion Furnaces DF1 through DF13 (via Scrubbers WS02 and WS07)

$$\text{Total HAP}_{DF} = \text{HEF}_{DF} * Q_{\text{cell}} / 2,000$$

Total HAP<sub>DF</sub> = Total monthly HAP emissions from DF1 through DF13, in tons/mo.

HEF<sub>DF</sub> = HAP emission factor(s) for DF1 through DF13, determined in accordance with Condition 6.5 (use the emission factor in Application No. 28321 before the initial performance test is conducted), in lb/cell.

Q<sub>cell</sub> = Number of photovoltaic cells produced per month, determined in accordance with Condition 7.6b., in cells/mo.

- c. Chemical Junction Isolation and PSG Removal CJP1 through CJP6 (via Scrubbers WS03 and WS05)

$$\text{Total HAP}_{CJP} = \text{HEF}_{CJP} * Q_{\text{cell}} / 2,000$$

Total HAP<sub>CJP</sub> = Total monthly HAP emissions from CJP1 through CJP6, in tons/mo.

HEF<sub>CJP</sub> = HAP emission factor(s) for CJP1 through CJP6, determined in accordance with Condition 6.6 (use the emission factor in Application No. 28321 before the initial performance test is conducted), in lb/cell.

- d. Back Side Chemical Deposition Systems BD01 through BD07 (via Scrubbers DAS01 through DAS04)

$$\text{Total HAP}_{BD} = \text{HEF}_{BD} * Q_{\text{cell}} / 2,000$$

Total HAP<sub>BD</sub> = Total monthly HAP emissions from BD01 through BD07, in tons/mo.

HEF<sub>BD</sub> = HAP emission factor(s) for BD01 through BD07, determined in accordance with Condition 6.7 (use the emission factor in Application No. 28321 before the initial performance test is conducted), in lb/cell.

- e. Front side Chemical Deposition Systems CD01 through CD15 (via Scrubbers SCD1 through SCD15)

$$\text{Total HAP}_{CD} = \text{HEF}_{CD} * Q_{\text{cell}} / 2,000$$

Total HAP<sub>CD</sub> = Total monthly HAP emissions from CD01 through CD15, in tons/mo.

HEF<sub>CD</sub> = HAP emission factor(s) for CD01 through CD15, determined in accordance with Condition 6.7 (use the emission factor in Application No. 28321 before the initial performance test is conducted), in lb/cell.

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- f. Metal Paste Application Lines MP01 through MP08 (via Thermal Oxidizers OX01 through OX08)

$$\text{Total HAP}_{\text{MP}} = \sum \{ \text{PU} * \text{HAP}\% * [\% \text{DT} + (1 - \text{DRE}) * (1 - \% \text{DT})] \} / 2,000$$

$$\% \text{DT} = (\text{T}_{\text{DT}} / \text{T}_{\text{DR}}) * 100\%$$

Total HAP<sub>MP</sub> = Total Monthly HAP emissions from MP01 through MP08, in tons/mo.  
PU = Monthly metal paste usage by MP01 through MP08, combined, determined in accordance with Condition 7.2c., in lbs/mo.  
HAP% = HAP content of the paste, determined in accordance with Condition 7.6a., in percentage.  
%DT = RTO percent down time, in percentage.  
DRE = Average RTO control efficiency, determined in accordance with Condition 6.3, in percentage.  
T<sub>DT</sub> = Total RTO downtime, determined in accordance with Condition 7.2d., in hrs/mo.  
T<sub>DR</sub> = Total operating hours per month that any metal print lines are in operation (non-cumulative), determined in accordance with Condition 7.2e., in hrs/mo.

- g. Precision Materials Modification System – Machine PMMS1 through PMMS6 and R&D Chemical Deposition/R&D RDCD/RD LPCVD (via Dry Scrubbers DS01 through DS07)

$$\text{Total HAP}_{\text{PMMS}} = \sum (\text{HEF}_{\text{PMMS}} * \text{T}_{\text{PMMS}}) / 2,000$$

$$\text{Total HAP}_{\text{R\&D}} = \text{HEF}_{\text{R\&D}} * \text{T}_{\text{R\&D}} / 2,000$$

Total HAP<sub>PMMS</sub> = Total monthly HAP emissions from Dry Scrubbers DS02 through DS07, in tons/mo.  
HEF<sub>PMMS</sub> = HAP emission factor(s) for Dry Scrubbers DS02 through DS07; use 0.0000783 lb/hr for BF<sub>3</sub>, 0.0001263 lb/hr for HF, and 0.0000301 lb/hr for PH<sub>3</sub>.  
T<sub>PMMS</sub> = Monthly operating hours of each of Dry Scrubbers DS02 through DS07, determined in accordance with Condition 7.6c. (applicable for each HAP), in hrs/mo.  
Total HAP<sub>R&D</sub> = Total monthly HAP emissions from Dry Scrubber DS01  
HEF<sub>R&D</sub> = HAP emission factor(s) for Dry Scrubber DS01; use 0.00864 lb/hr for SiH<sub>4</sub>, 0.02608 lb/hr for NH<sub>3</sub>, 0.00104 lb/hr for BF<sub>3</sub>, 0.00010 lb/hr for PH<sub>3</sub>, and 0.00168 lb/hr for HF.  
T<sub>R&D</sub> = Monthly operating hours of each of Dry Scrubber DS01, determined in accordance with Condition 7.6d., in hrs/mo.

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The Permittee shall combine the data obtained in accordance with Paragraphs a. through g. of this Condition in order to determine the facility-wide actual monthly single and combined HAP emission rates. All demonstration calculations, including any Division-approved emission factor, control efficiency used in the calculations, shall be kept as part of the records required in Condition 7.6. The Permittee shall notify the Division in writing if emissions of any individual hazardous air pollutant equal to or exceed 0.83 tons from the entire facility, or if emissions of all listed hazardous air pollutants combined equal to or exceed 2.08 tons from the entire facility, during any calendar month. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to maintain compliance with the emission limit in Condition 2.2.

- 7.8 The Permittee shall use the emission rates obtained in accordance with Condition 7.7 to determine the facility-wide twelve month rolling total emissions of each individual HAP and the facility-wide twelve month rolling total combined HAP emissions ending in each calendar month. The Permittee shall notify the Division in writing if the combined HAP emissions from the entire facility equal or exceed 25 tons and/or any individual HAP equals or exceeds 10 tons during any consecutive twelve-month period. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to attain compliance with the emission limit in Condition 2.2.

[391-3-1-.02(6)(b)1]

- 7.9 The Permittee shall calculate NO<sub>x</sub> emissions from Wet Scrubbers WS03 and WS05 based on the emission rate determined in Condition 6.6 and the fuel usage records for CJP1 through CJP6 (deduct the data of Condition 7.2i. from the data of Condition 7.2g., in ft<sup>3</sup>/mo with a natural gas heat content of 1,020 Btu/ft<sup>3</sup>). The Permittee shall use the NO<sub>x</sub> emission factor in Application No. 28321 before the initial performance test specified in Condition 6.6 is conducted. The Permittee shall calculate NO<sub>x</sub> emissions from other NO<sub>x</sub> emitting sources, such as water heaters and emergency generators, using either AP-42 emission factors or Division-approved emission factors and records obtained in accordance with Conditions 7.2h. and 7.2i. All demonstration calculations, including any Division-approved emission factor used in the calculations, shall be kept as part of the monthly records. The Permittee shall notify the Division in writing if the combined total monthly NO<sub>x</sub> emissions from the facility equal to or exceed 2.08 tons during any calendar month. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to maintain compliance with the emission limit in Condition 2.3.

[391-3-1-.02(6)(b)1]

- 7.10 The Permittee shall use the calculations required by Condition 7.9 to determine the total NO<sub>x</sub> emissions from the entire facility for the twelve consecutive month period ending in each calendar month. The Permittee shall notify the Division in writing if the total NO<sub>x</sub> emissions equal or exceed 25 tons during any consecutive 12-month period. This notification shall be postmarked by the fifteenth day of the following month and shall include an explanation of how the Permittee intends to attain future compliance with the emission limit in Condition 2.3.

[391-3-1-.02(6)(b)1]

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7.11 The Permittee shall maintain a record of the daily scrubbant flow rate readings for Wet Scrubbers WS01 through WS07, DAS01 through DAS04, and SCD1 through SCD15. Any two consecutive readings below 80% of the minimum scrubbant flow rate specified in Condition 4.5 for any scrubber shall be reported to the Division. The report will include these readings and any corrective actions taken. This notification shall be submitted within 15 days after the date of the reading. Until testing is conducted and the results submitted, the facility shall use the manufacturer's recommended flow rate as the minimum flow rate.

**[391-3-1-.02(6)(b)1]**

7.12 During times when the texturizer is used in Wet Benches, the Permittee shall maintain a record of the daily temperature readings of each texturizer process bath for Wet Benches WB01, WB02, WB04 and WB05 through WB11. The Permittee shall notify the Division if any bath exceeds 95°C during any single measurement. The report will include these readings and any corrective actions taken. This notification shall be submitted within 15 days after the date of the reading.

**[391-3-1-.02(6)(b)1]**

7.13 The Permittee shall maintain a log of the pressure drop monitoring required by Condition 5.2c.i. As a minimum, the record shall include the date and time of the observation, the filter manufacturer's recommended maximum pressure drop, the observed pressure drop, and note if the filter media was changed.

**[391-3-1-.02(6)(b)1]**

7.14 The Permittee shall maintain a record of the daily pH readings for Wet Scrubbers WS01 through WS07. Any two consecutive readings outside the pH range specified in Condition 4.6 for any scrubber shall be reported to the Division. The report will include these readings and any corrective actions taken. This notification shall be submitted within 15 days after the date of the reading. Until testing is conducted and the results submitted, the facility shall maintain the scrubbant pH within the manufacturer's recommended pH range.

**[391-3-1-.02(6)(b)1]**

7.15 The Permittee shall maintain monthly hourly average records of the wafer throughput, in units per hour, that are processed through the wet benches. Any exceedance of 110% of throughput determined during the most recent performance test shall be reported to the Division. The report will include these readings and any corrective actions taken. This notification shall be submitted within 15 days after the date of the reading.

**[391-3-1-.02(6)(b)1]**

## **8. Special Conditions**

8.1 At any time that the Division determines that additional control of emissions from the facility may reasonably be needed to provide for the continued protection of public health, safety and welfare, the Division reserves the right to amend the provisions of this Permit pursuant to the Division's authority as established in the Georgia Air Quality Act and the rules adopted pursuant to that Act.

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- 8.2 The Permittee shall calculate and pay an annual Permit fee to the Division. The amount of the fee shall be determined each year in accordance with the “Procedures for Calculating Air Permit Application & Annual Permit Fees.”
- 8.3 All Georgia Air Quality Permits previously issued to this facility, including Air Quality Permit No. 3672-135-0272-S-03-0 and its amendment, are hereby revoked in their entirety.